

ABSTRACT

This invention relates to both the apparatus and method for increasing the sensitivity of measuring the amount of radioactive material in waste by reducing the interference caused by cosmic ray generated neutrons. The apparatus includes: (a) a plurality of neutron detectors, each of the detectors including means for generating a pulse in response to the detection of a neutron; and (b) means, coupled to each of the neutrons detectors, for counting only some of the pulses from each of the detectors, whether cosmic ray or fission generated. The means for counting includes a means that, after counting one of the pulses, vetos the counting of additional pulses for a prescribed period of time. The prescribed period of time is between 50 and 200 μ s. In the preferred embodiment the prescribed period of time is 128 μ s. The veto means can be an electronic circuit which includes a leading edge pulse generator which passes a pulse but blocks any subsequent pulse for a period of between 50 and 200 μ s. Alternately, the veto means is a software program which includes means for tagging each of the pulses from each of the detectors for both time and position, means for counting one of the pulses from a particular position, and means for rejecting those of the pulses which originate from the particular position and in a time interval on the order of the neutron die-away time in polyethylene or other shield material. The neutron detectors are grouped in pods, preferably at least 10. The apparatus also includes means for vetoing the counting of coincidence pulses from all of the detectors included in each of the pods which are adjacent to the pod which includes the detector which produced the pulse which was counted.